

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
COMBINATION PURGE VALVE, ITEM 105 ----- A/L 9819-08 (1)	2/2	105FM07 Combination purge valve fails to close. Contamination or foreign material; defective O-ring/gasket/button or spring.	END ITEM: Valve seat jammed in open position. GFE INTERFACE: PLSS gas leakage to ambient. Depletion of primary O2 supply and SOP. MISSION: Terminate EVA prep. Loss of use of one EMU. CREW/VEHICLE: None. TIME TO EFFECT /ACTIONS: Seconds. TIME AVAILABLE: N/A TIME REQUIRED: N/A REDUNDANCY SCREENS: A-N/A B-N/A C-N/A	A. Design - All components are machined/molded/fabricated to exacting tolerance, generally + .005 or less. These tight tolerances established by design preclude contamination or foreign material from entering the housing, valve or cover. The stem for the button is fabricated from 302/304 stainless steel for strength and the button is fabricated from Vespel SP-1 for heat resistance and strength. The button is shielded from direct impact from most directions by the EVVA shell, HUT, Arm, PLSS and the cover of the CPV which would preclude damage to the button. The button spring is made of 302 stainless steel and is captured between the button stem and spring seat which eliminates the possibility of a broken spring. Compression rate, installed height, pre-load and interface geometry have all been designed to maximize spring life. The O-ring is fabricated from silicone rubber and lubricated with Krytox grease prior to installation. The O-ring prevents internal gas from leaking through the CPV. Incidence of loose/missing screws in the CPV is precluded in design by the use of self-locking screws. B. Test - Acceptance: See Inspection. PDA: The following tests are conducted on the Helmet/CPV in accordance with ILC Document 0111-70028J. 1. CPV flow test. 2. CPV operating torque test to verify torque between 0.50 and 7.0 lb.-in. Certification: The helmet with CPV installed was successfully tested (manned) during SSA certification to duplicate operational life (Ref. ILC Engineering Memorandum 83-1083 and EM 98-0008). The following usage, reflecting requirements of significance to the CPV was documented during certification. Requirement S/AD Actual ----- ---- ----- CPV Actuation Cycles 81 540 The helmet with CPV was successfully subjected to an ultimate pressure of 10.6 psig during SSA Certification testing. Ref. ILC Document 0111-70027. This is two times normal maximum operating pressure based on 5.3 psi. Recertification to 5.5 psi was by test and analysis (Ref. ILC EM 84-1108).

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		105FM07		<p>It has also passed S/AD shock, vibration and acceleration requirements in Hamilton Standard cert testing (ref. Hamilton Standard TER's 3067, 3048, 3043, and 3076).</p> <p>C. Inspection - Components and material manufactured to ILC requirements at an approved supplier are documented from procurement through shipping by the supplier. ILC incoming receiving inspection verifies that the materials received are as identified in the procurement documents, that no damage has occurred during shipment and that supplier certifications have been received which provides traceability information.</p> <p>The following MIP's are performed during the CPV assembly manufacturing process to assure the failure causes are precluded from the fabricated item:</p> <ol style="list-style-type: none">1. Verification of cleanliness to VC level.2. Verification of screw installation.3. Verification of lubrication.4. Inspection of O-ring for gouges, nicks, tears or degradation.5. Inspection of CPV for dents, cracks, nicks, distortion. <p>During PDA, the following inspection points are preformed at the Helmet Assembly level in accordance with ILC Document 0111-70028J: Inspection for VC level cleanliness. Inspection for damage following proof pressure test. Verification of proper operating torque.</p> <p>D. Failure History - None.</p> <p>E. Ground Turnaround - Tested for non-EET processing per FEMU-R-001, Pre-Flight Test Requirements, CPV Torque. None for EET processing. Additionally, every 4 years during Helmet/EVVA structural and leakage tests, the proper operation of the CPV to full open and close positions, proper lock operations and visual confirmation of unobstructed flow path are verified.</p> <p>F. Operational Use - Crew Response - Pre/post-EVA : Troubleshoot problem, if no success EMU no go for EVA.</p> <p>Special Training - No training specifically this failure mode.</p> <p>Operational Considerations - CPV not nominally actuated prior to EVA. Flight rules define go/no-go criteria related to EMU pressure regulation and pressure integrity.</p>

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-105 HELMET ASSEMBLY
CRITICAL ITEM LIST (CIL)
EMU CONTRACT NO. NAS 9-97150

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